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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,447	07/24/2006	Dai Kobayashi	284475US3PCT	8960
22850 7590 03/19/2008 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER MASKELL, MICHAEL P	
			ART UNIT	PAPER NUMBER
			2881	
			NOTIFICATION DATE	DELIVERY MODE
			03/19/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/564,447	Applicant(s) KOBAYASHI ET AL.	
	Examiner MICHAEL MASKELL	Art Unit 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/10/2006;04/12/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4, and 5 rejected under 35 U.S.C. 102(b) as being anticipated by Matsuyama (U.S. Patent 6,415,653 B1).

Regarding claim 1, Matsuyama discloses a probe for a scanning probe microscope, comprising: (a) a base of the probe for the probe microscope (136); (b) a support cantilever (118) extending horizontally from the base, a top end of the support cantilever being processed to have a sloped surface so as not to prevent a measuring cantilever from being optically observed (Figs. 1-9 show this processing, Fig. 10 shows the finished product); wherein the measuring cantilever (140) is provided on the top end of the support cantilever and the measuring cantilever has a length less than or equal to 20 micrometers and a thickness less than or equal to 1 micrometer (column 8, lines 45-48).

Regarding claim 2, Matsuyama discloses wherein the base and the support cantilever are formed from single-crystal silicon (column 7, lines 7-17; the base is formed from single crystal silicon piece 102 and the support cantilever and measuring cantilever are formed from single crystal silicon layer 106) and the measuring cantilever is formed from a single-crystal silicon thin film ("thin film" is a relative term, and in the

processing steps disclosed by Matsuyama, single crystal silicon layer 106 is etched in the area of the measuring cantilever to make it thinner than the support cantilever made from the same piece. Hence, the examiner submits that the portion of single crystal silicon layer 106 that forms the measuring cantilever qualifies as a “thin film” after it is processed to be significantly thin in the making of the measuring cantilever), and wherein the measuring cantilever is coupled with the top end of the support cantilever (see all Figures).

Regarding claim 4, Matsuyama discloses wherein the length of the measuring cantilever is precisely defined by reducing the thickness of the measuring cantilever to less than the thickness of a coupling portion between the measuring cantilever and the support cantilever (column 7, line 16 states that the SiO layer that couples the measuring cantilever to the support cantilever is 1 micrometer thick; column 8, line 46 states that the measuring cantilever is 0.4 micrometers thick; also, Fig. 10 shows that the portion of support cantilever 118 that extends past base 136 to couple to measuring cantilever 140 is substantially thicker than measuring cantilever 140).

Regarding claim 5, Matsuyama discloses wherein the length of the measuring cantilever is precisely defined by reducing the width of the measuring cantilever to less than the width of a coupling portion between the measuring cantilever and the support cantilever (Fig. 10 shows the tapering of support cantilever 118 as it couples to measuring cantilever 140, such that the measuring cantilever's width is less than the width of a coupling portion between the measuring cantilever and the support cantilever).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6 and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Toda (JP 10-307144) in view of Matsuyama.

Regarding claim 6, in order to properly perform the obviousness analysis of claim 6, it is necessary to revisit the limitations of claims 1 and 2. Although these claims are fully anticipated by Matsuyama, they are also nearly totally described by Toda with the exception of some features which are rendered obvious in combination with Matsuyama's teachings as follows:

Claim 1 – Toda discloses a probe for a scanning probe microscope, comprising: (a) a base of the probe for the probe microscope (28); and (b) a support cantilever (26) extending horizontally from the base, a top end of the support cantilever being processed to have a sloped surface (26a) so as not to prevent a measuring cantilever from being optically observed; wherein the measuring cantilever (20) is provided on the top end of the support cantilever and the measuring cantilever has a thickness less than or equal to 1 micrometer (paragraph 0040). Toda does not teach that the measuring cantilever has a length less than or equal to 20 micrometers, rather he simply teaches that the length (L) of the measuring cantilever should be as short as possible, and

mentions in passing the length being 50 micrometers or less (paragraph 0027); however, Matsuyama, as described in the 102 rejections above, teaches that the measuring cantilever can be made shorter than 20 micrometers. Therefore, motivated by Toda's teaching to make the length as short as possible, one of ordinary skill would have found it obvious to combine the teachings to make the measuring cantilever 20 micrometers or less in length.

Claim 2 – Toda teaches wherein the base and the support cantilever are formed from single-crystal silicon (paragraph 0042) and wherein the measuring cantilever is coupled with the top end of the support cantilever (Fig. 3). Toda does not teach wherein the measuring cantilever is formed from a single-crystal silicon thin film, but rather teaches that it comprises silicon nitride (paragraph 0040); however, Matsuyama teaches that single-crystal silicon is usable as a measuring cantilever (see 102 rejections above). Since the simple replacement of one material known to be used in the measuring cantilever with another material known to be used in the measuring cantilever is well within the technical grasp of one of ordinary skill in the art and the results would be predictable (the results are described by Matsuyama, who used single-crystal silicon as the measuring cantilever), it would have been obvious to one of ordinary skill in the art to combine the teachings such that the measuring cantilever in Toda is formed from a single-crystal silicon thin film.

Returning now to claim 6, Toda teaches the fabrication steps of: fabricating the

base and the support cantilever by processing a single-crystal silicon substrate (paragraph 0042); fabricating the measuring cantilever (paragraphs 0053-0055) by processing a thin-film of an SOI substrate different from the single-crystal silicon substrate; bonding the measuring cantilever with the support cantilever (paragraph 0057); and removing a handling wafer and a buried oxide film of the SOI substrate (Figs. 2f-h and paragraphs 0058-0059). Toda does not teach that the measuring cantilever is formed of single-crystal silicon, rather he teaches that it is made of silicon nitride; however Matsuyama (as explained above) teaches that single-crystal silicon is an alternative material from which to form the measuring cantilever. It would therefore have been obvious to one of ordinary skill in the art to simply replace the separate silicon nitride piece that forms the measuring cantilever and is bonded to the support cantilever with another separate single crystal silicon piece that is bonded to the support cantilever after being processed into the shape of the measuring cantilever (the appropriate methods for processing single crystal silicon into a measuring cantilever are taught by Matsuyama). Doing so would be a simple replacement of one alternative material known to be useful as a measuring cantilever with another, to achieve predictable results.

Regarding claim 7, Toda teaches the step of forming a probe tip on the top end of the measuring cantilever by means of wet etching (paragraph 0063).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The applicant should note that JP 8-320326 A, JP 10-311843 A,

JP 2002-5810 A, JP 2000-168755 A and JP 2000-206126 A, in combination with each other and/or Matsuyama and/or Toda cited above, disclose the claimed subject matter. The applicant should refer to the international search report for PCT/JP2004/009911 for more details regarding the applicability of these references.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL MASKELL whose telephone number is (571)270-3210. The examiner can normally be reached on Monday-Friday 8AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571/272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael Maskell/

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Examiner, Art Unit 2881

07 March 2008

/ROBERT KIM/

Supervisory Patent Examiner, Art Unit 2881